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ORIGINAL ARTICLES.

PRIMARY SARCOMA OF THE IRIS WITH REPORT OF A CASE OF LEUCO-SARCOMA OF THE IRIS AND CYSTS OF THE CILIARY BODY.*

By W. A. Shoemaker, M.D.,
St. Louis, Mo.

Histological Examination by Adolf Alt, M.D.

H. A., aged 53, first consulted me in June, 1899, at which time he was suffering from accommodative asthenopia, which was relieved by the correction of his ametropia. His eyes at that time were in a perfectly healthy condition with the exception of a mild chronic catarrhal conjunctivitis which gave him little discomfort.

On March 3, 1908, he again consulted me complaining of his eyes feeling tired after reading. A thorough examination revealed no intra- or extra-ocular disease with the exception of the above mentioned chronic conjunctivitis.

His ametropia had changed somewhat and new lenses were prescribed which gave him entire comfort until December 1st, 1908, when he again presented himself complaining of not being able to read comfortably. Examination revealed the necessity of a change of glasses. His vision at this time as on previous visits was 17/12, with either eye, with his ametropia corrected.

*Read at the March meeting of the St. Louis Ophthalmological Society.

Instead of the ophthalmoscope revealing absolutely nothing pathological, as in previous examinations, it brought into view a small pigmented growth about 1x2 mm. in size on the pupillary margin of the right iris, on the temporal side. There was no pain, ciliary injection or photophobia; in short, absolutely no inflammatory symptoms. A mydriatic was used which promptly dilated the pupil ad maximum. A careful examination of the fundus revealed nothing abnormal.

Three weeks later the growth was about 2x3 mm. In view of its rapid growth a prompt removal by iridectomy was advised.

The operation was performed on December 23d, 1908, under cocain, and the specimen submitted to Dr. Alt, who, on December 29th, reported that the tumor was a leuco-sarcoma.

Twenty-four hours after the iridectomy the anterior chamber was restored, the pupil well dilated and the ciliary injection very slight. Atropin was instilled and the bandage reapplied.

The eye was dressed daily and atropin instilled. The pupil remained widely dilated and the ciliary injection quite moderate.

On the fourth day while dressing the eye a hæmorrhage took place which about half filled the anterior chamber. By the next morning this was largely absorbed and the eye seemed to be doing very well. On the morning of the sixth day, a fresh hæmorrhage was found to have occurred, which practically filled the anterior chamber. This seemed to indicate a degeneration of the bloodvessels, leading me to the conclusion that the sarcoma involved more than the iris.

The situation was explained to the patient, who promptly decided that he did not want to take any chances and accepted my advice to have the eye enucleated, which was done under local anæsthesia that afternoon.

The eye was given to Dr. Alt for histological examination, whose report on it and the tumor is as follows:

"I received the specimen, which Dr. Shoemaker had removed when making the iridectomy, in a 5% formol solution. Unfortunately it was not flat but somewhat rolled up and folded. After hardening it in the usual manner in alkohol and embedding it in celloidin, the sections showed the following conditions:

The tissue of the iris was throughout infiltrated with round cells to a moderate degree. The uveal (retinal) layers, were, especially near the pupillary margin, more than double the normal thickness and reached over the sphincter edge to some dis-

tance on the anterior surface of the pupillary margin. In bleached specimens this was seen to be due to a considerable newformation of cells which seemed to push each other toward the anterior surface of the iris. The ectropium uveæ in this case was not due to any newformation of tissue on the anterior surface of the iris pulling the uveal layer forward as is usually the case.

The iris tissue proper, in general, appeared rather thinner than usual, except in one place some millimeters behind the sphincter muscle where in about a half dozen sections a small pear-shaped thickening occurred on its posterior surface. (See Fig. 1.)

FIG. 1.

This thickening looks almost as if it was simply a fold in the iris. However, on further study it proved to be a solid tumor which, perhaps, by its weight had drawn the anterior surface of the iris slightly inward. In none of the sections was it possible to produce a division into two component parts, which would have been easily accomplished, had it been simply a fold in the iris, as simple pressure will do with the other folds in the same sections.

The thinner base of this tumor consists of iris tissue almost devoid of pigment cells; the main body of the little tumor, not as large as a pin head, is made up of spindle cells, free from all pigment, surrounded by a small amount of tissue which can still be recognized as iris tissue and free pigment granules, remnants of destroyed iris cells.

These spindle cells form a solid mass which is not pervaded by any large blood vessels. From these findings I made the histological diagnosis of a beginning *unpigmented spindle cell sarcoma* of the iris.

A little later I received the eyeball from which this tumor had been removed by iridectomy. Its histological conditions proved, also, of great interest.

The anterior chamber contained a blood coagulum which seemed attached to the stump of the iris but the origin of which could be traced backwards to the pars non-plicata of the ciliary body. I have not been able to find the exact spot from which it

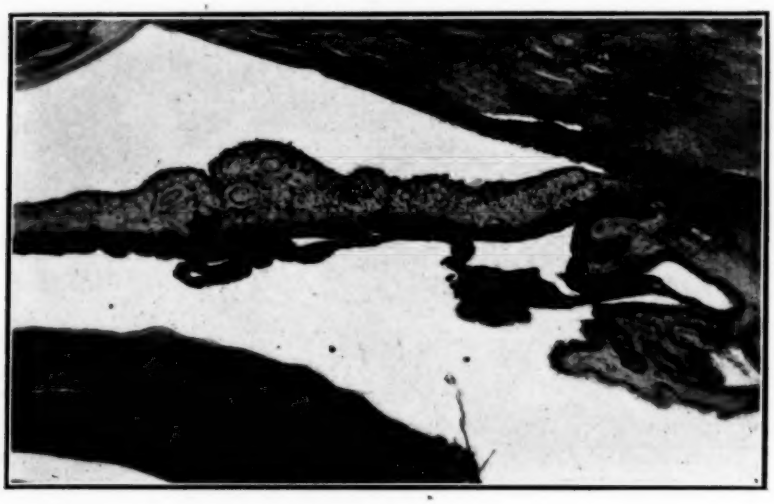

FIG. 2.

started nor a ruptured bloodvessel. The coagulum contained a great many leucocytes, especially such with a multiform nucleus. The iris stump corresponding to the site of the hæmorrhage is highly infiltrated with round cells.

It seemed to be especially important to find out whether or not there was any tumor of a sarcomatous nature in the ciliary body. There was none to be found. However, both the part of the iris remaining intact after the iridectomy and the ciliary body showed such extensive changes as I have never encountered heretofore.

In almost every section cystic changes were found at the posterior surface of the iris as well as at the apex of the ciliary body. Sometimes one cyst started at the apex of the ciliary

body and reached forward at the back of the iris almost to the sphincter edge; sometimes I found only a solitary cyst at the

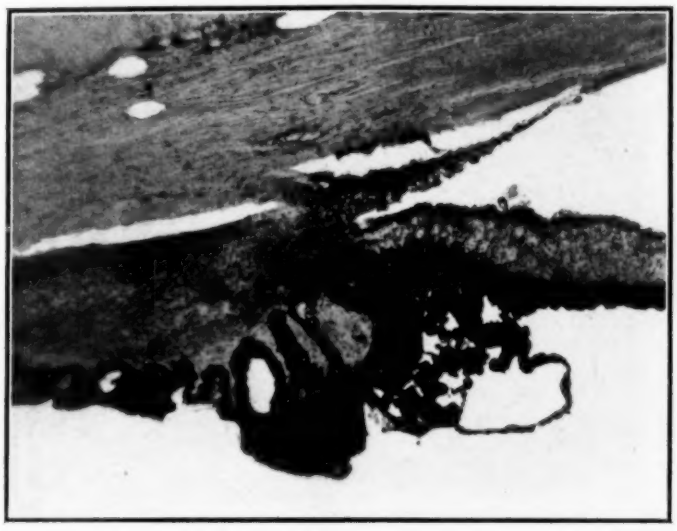

FIG. 3.

apex of the ciliary body or an isolated one on the posterior surface of the iris. In other sections these cysts showed two, three

FIG. 4.

or four apparently separate chambers. Some of the cysts appeared perfectly empty, some contained large round pigmented bodies and, sometimes besides these, some blood cells.

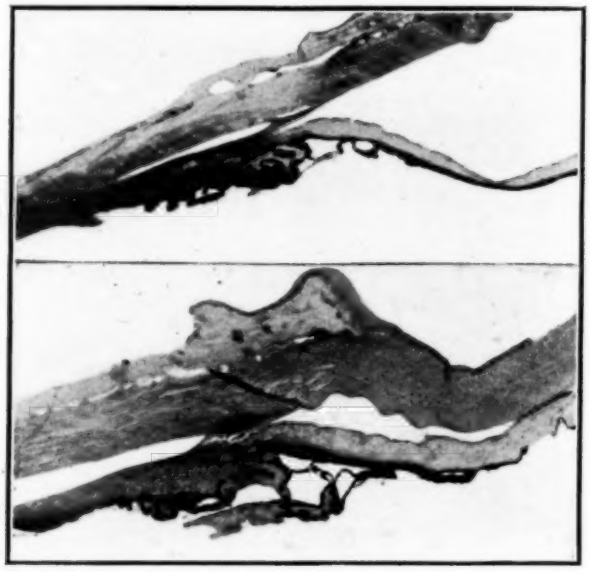

FIG 5.

The walls of the iris cysts consisted of the (retinal) uveal part of the iris, the posterior layer being separated from the an-

FIG. 6.

terior one. Bleached specimens show that this separation is not a simple division between the two layers, nor would such a simple division allow of the size of the cyst. There has evidently been a very considerable increase in the number of cells forming the wall which is detached from the iris. This is especially well shown in the bleached specimens. (See Fig. 7.)

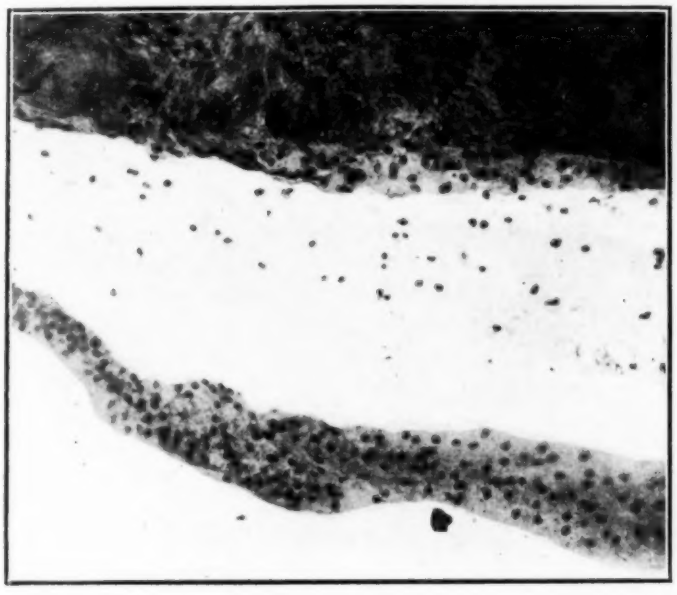

FIG. 7.

The cysts at the apex of the ciliary body have for their detached wall, sometimes unpigmented, sometimes pigmented cells. Thus it appears, as if the so-called retinal part of the ciliary body, in the norm unpigmented, had, as it does on the back of the iris, taken on pigment. The round pigmented heaps which fill these cysts in places are composed of epithelial cells, evidently shed from the preformed pigment epithelium. Similar cells are found in great numbers between the cyst wall, on the back of the iris. In a few sections which show no cyst formation the apex of the ciliary body is in contact with the iris periphery, the two being separated or held together by a very thick mass of pigment epithelium. It thus looks as if there might have been formerly only such an adhesion between the two parts which later in life became separated thus leading to the cystic formation.

Treacher Collins has described cysts on the back of the iris and compares the detachment between the two retinal layers of the iris to the detachment of the retina.

Such separations of the two retinal layers of the iris are now and then met with, although the changes found in diabetes should not be confounded with their occurrence, as Parsons has done.

Similar cysts of the ciliary body have been described by Kuhnt, Brailey and others. Greef in giving an account of a case of cysts of the ciliary body thinks their origin explained by the retention of the secretion of the so-called glands of Treacher Collins. Even if such glands existed, they could not explain the formation of the cysts in the case under consideration, as the region in which these formations lie is far removed from the anterior apex of the ciliary body.

The appearances in the present case are such that it seems that we have to deal with an immense, though more or less localized, hyperplasia of the retinal cells on the apex of the ciliary body as well as on the back of the iris, which may, perhaps, have been of congenital origin, and may have increased for some reason later in life. May be, the presence of the sarcoma in the iris had some influence upon this increasing hyperplasia."

This case illustrates, beautifully, our inability to at all times differentiate, clinically, between a melano-sarcoma and a leuco-sarcoma. From the history and appearance of the tumor I was certain I had to deal with a melano-sarcoma. What I took to be a part of the tumor was simply a part of the pigmented layer of the iris which was pushed into the pupillary space by the leuco-sarcoma.

Wood and Pusey,[1] in 1902, succeeded in collecting about ninety recorded cases of primary sarcoma of the iris. In eighty-three of these a histological examination had been made. Of these, eleven were leuco-sarcomas and the remainder melano-sarcomas. Since the publication of this exhaustive article, cases have been reported by Berens,[2] Poulard [3] E. V. L. Brown,[4] (3 cases), H. O. Tyson,[5] Henri and Angieras,[6] H. Coppez,[7] Fehr,[8] Rogman,[9] Kayser,[10] Kopetsky and Von Richtberg,[11] and Alt;[12] a total of thirteen, of which five were leuco-sarcomas.

Since Tay,[13] in 1866, reported his case of "Primary Cancer of the Iris" we seem to have a total of about one hundred and three

reported cases; rather a goodly number for a disease that is usually considered rare.

Considering the relative size of the iris as compared with the choroid, it is a question as to whether it is not as frequently involved as is the latter tissue.

Melano-sarcomas appear to occur more frequently in people over forty and leuco-sarcomas in younger people. Deductions, however, are unreliable on account of the small number of cases and the ease with which pigment may be overlooked in the so-called leuco-sarcomas. Females seem to be rather more frequently attacked than males. As a rule only one eye is involved, but there are four or five cases on record in which both eyes were affected. In fifty-six cases the primary position of the tumor was as follows: Thirty-five in the lower half, fourteen in the upper, five in the inner, and two in the outer half.

Sometimes several tumors occur in the same iris which Foster[14] thinks is probably due to local dissemination by means of the aqueous and lymphatics and not by the blood. Sometimes pigmented and non-pigmented tumors occur side by side.

The growth may remain in the first, or non-inflammatory stage for years; in the second or inflammatory stage it progresses more rapidly, producing perforation of the globe—the third stage—and later causes metastases, the fourth and final stage. According to Kerschbaumer, the growths generally develop from the anterior layers of the iris; occasionally from the posterior layers.

They sometimes develop from naevi and melanomas.

Sarcoma of the iris may be confounded with *melanomas, cysts, gummas and tubercles.* Melanomas and naevi are congenital, stationary growths, while sarcoma is progressive. Melanomas are darker in color, do not, as a rule, project above the plane of the iris and do not cause inflammatory symptoms. When a clinical diagnosis is impossible the growth should be excised and a histological examination made. In this connection, I desire to refer to two cases reported by Alt [16] in 1900 and one by B. Kayser[10] in 1903, which illustrate the difficulty of making a diagnosis, in certain cases, even after a histological examination.

In Alt's first case the pigment spot was first noticed when five years of age. It showed no tendency to enlarge for twenty-nine years, when it began to grow, and five years later a diagnosis of sarcoma was made and the eye enucleated. In the second case

the pigment spot was noticed at the age of two years, and at the age of eleven years a diagnosis of sarcoma was made and the eye removed.

A histological examination of the specimens convinced the author that the first specimen was a capillary angioma and the second a venous angioma for the following reasons: (1) The length of time the pigment spots existed before the growth began to develop. (2) The absence of characteristic cell infiltration in neighboring tissues, and (3) the presence of cavities which are characteristic of angioma. B. Kayser's[10] description of his case corresponds almost exactly with Alt's description of his first case. Kayser, however, looks upon his case as a sarcoma and believes that Alt's is also.

Cysts of the iris have a bluish transparent appearance, are usually round and are generally the result of a traumatism.

In the non-inflammatory stage of sarcoma of the iris the differential diagnosis from gumma and tubercle is not difficult, as both the latter promptly set up inflammatory reaction. In the second stage it is not so easy.

In sarcoma the iris reacts to a mydriatic, except at the site of the growth. In a tubercle and a gumma the iritis is usually severe, the aqueous is hazy and hypopyon is often present.

The presence of multiple tumors does not, necessarily, indicate tuberculosis, as some authors maintain, because multiple growths are sometimes found in sarcoma.

When the appearance and the history of the case does not enable us to make a diagnosis, the therapeutic and the tuberculin tests should be made. A gumma will, of course, respond quite promptly to mercury and iodide of potassium, internally, combined with the proper local treatment; while the tuberculin test will, according to C. S. Bull,[15] produce a general reaction in at least eighty-five per cent. of the cases, and some local reaction in about fifty per cent.

The *treatment of sarcoma* of the iris consists in removing *all* of the sarcomatous tissue as soon as the diagnosis is made.

There is, however, a wide difference of opinion as to what constitutes *effective removal*. An analysis of the cases referred to by Wood and Pusey may assist us in deciding what operation to advise—enucleation or iridectomy.

The eye was enucleated in fifty-seven cases. In seven of these there was no report concerning the involvement of other parts of

the iris or neighboring tissues. In four cases consent to enucleation could not be obtained until after other tissues became involved. In two cases the growth *seemed* to be confined to the iris. In one of these the whole iris was involved. In two cases the iris only was involved. Three cases were included in this class by Wood and Pusey; the third case being Dr. Alt's second case, which, he informs me, was not a primary sarcoma of the iris but secondary to sarcoma of the ciliary body. In the second case,—Andrew's first case—there were in the stump, after iridectomy, cells which looked not unlike the cells of the tumor.

In the fifty seven enucleated eyes we seem to find only one (Hosch's) in which the iris only was involved. In twenty-seven instances an iridectomy was done. In eight of these cases other tissues were probably involved, and a return of the growth was expected. In three there was no after history and two were under observation four months or less. In one there was no recurrence after one year; in three no recurrence after four years; in one no recurrence after five years; in one no recurrence after eleven years and in one no recurrence after "many years."

In one (Krükow's), eleven years after the iridectomy, the ciliary body and the remainder of the iris were found infiltrated by tumor cells and the eye was enucleated. Five years later the patient died of general sarcoma—lungs, liver, kidneys, etc.

Of the twenty-seven cases, two—Little's and Post's—may be looked upon as successes. It seems to me that from such findings we can draw only one conclusion, viz.: Enucleate the eye as soon as the diagnosis is made.

BIBLIOGRAPHY.

1. Wood and Pusey. Archives of Oph., 1902, Page 323.
2. Berens. Annal, d'oculis., V. 126, Page 71.
3. Poulard. Soc. d'oph. de Paris., Feb. 7th, 1905.
4. Brown, E. V. L. Jour. Amer. Med. Asso., Aug. 11th, 1906.
5. Tyson, H. O. Arch. of Oph., Jan., 1907, Page 69.
6. Henri and Augieras. Rec. d'oph., Aug., 1907.
7. Coppez, H. Rev. Gen. d'ophthal., Oct., 1903.
8. Fehr. The Hirschberg Fest-Schrift, 197.
9. Rogman. Annals, d'ocul., V. 129.
10. Kayser. Klin. Monat. f. Augenheilkunde, 41 Beilageheft, Page 136.
11. Kopetsky and von Rechtperg. Graefe's Arch., 53, Page 330.
12. Alt, A. Am. Journal Oph., 1904, Page 33.
13. Tay, W. Royal London Oph. Hosp. Reports, 1866, V. 230.
14. Foster. Pathology of the Eye, Vol. 1.
15. Bull, C. S. Medical Record, Dec. 9th, 1905.
16. Alt, A. Amer. Journal Oph., Dec., 1900.

A CERTAIN METHOD OF PREVENTING COMMON ERRORS OF THE OPTICIAN.

By William Martin Richards, M.D.,

NEW YORK CITY.

At one time or another, we have all met with cases of apparently hysterical eye-strain, in which no glasses seem to bring relief. I, myself, have recently seen an extreme instance of this; a woman of 36, who for fourteen years was unable to use her eyes at all, although she had consulted famous specialists in this country and in Europe. A diagnosis of hysterical eye-strain was finally made. The patient was fitted with an ordinary pair of cylinders, supplemented by mental suggestion given by a psychotherapist, and now she uses her eyes without discomfort. Such a condition as this arises from one or both of two causes: Either the fault of the oculist in prescribing the wrong glasses, or the fault of the optician in filling the right prescription wrongly. In the just mentioned case, if the right glasses had been prescribed by the oculist in the beginning, and correctly ground by the optician, this hysterical state would never have resulted. It is just such cases as these which are occasionally cured by Christian Science.

It seems to me, that we oculists are responsible, unconsciously, and unintentionally, for the passage of the recent optometry bills. We cannot blame the public for preferring to buy their glasses of an optician for a nominal price, when these glasses may, as they often do, cause no more discomfort, or give no less comfort, than those prescribed by reputable oculists, and ground expressly for them by an optician at much higher cost.

In regard to the mistakes of oculists, I find in my own case, and that of many of my patients, that, in astigmatism, an error even so small as two degrees in the axis of the cylinder, will cause headaches, nausea, and dizziness. In one case, pronounced indigestion was the result. In all patients under fifty years old, and even in some beyond that age where there is a spasm of accommodation, such slight differences as those mentioned can be found only when under full cycloplegia with homatropine, or atropine, subsequently subtracting +O. 75 if necessary, and it can easily be seen that, for these, the shadow test alone is abso-

lutely worthless. It is literally impossible for even the most skilled specialist to find a difference of two degrees in the pupil of a patient's eye, one meter away, when the pupil is only ¼ of an inch in diameter. The shadow test is useful, of course, as an aid, but the findings of it should never be final in people who can read. Another point which I wish to emphasize here, is the inadvisability of giving some patients full correction at once. This is true, not only of near-sighted, but also of far-sighted people. We should always aim to give our patients glasses which are comfortable first, and then gradually increase the correction until with the glasses we give, the eye is emmetropic. The interval, at the end of which we can give full correction, varies, of course, in different individuals. It seems best to tell the patient to return at the end of one year, or, in any event, to return for examination whenever the glasses prove uncomfortable. It is wise, if necessary, to give the patient bifocal glasses, even in young people, when the glass necessary to make them see comfortably for distance, is different from the one necessary to make them see comfortably to read with. A very good illustration of this is a patient sixteen years of age, who came to me with glasses fitted by an optician in conformity to our vicious new optometry bill. For the right eye, she was wearing a —3.0, and for the left eye, —3.0—.25 cyl. 180. Under homatropine, she accepted O. D. —5.25, O. S. —5.87—2.25. cyl. 165. The following day she stated that she could see perfectly with these glasses, and with entire comfort, both for reading and for distance, and I had them ground. She returned the next day, using the new glasses in the interim, but reported that now they were causing her great discomfort and even violent pain. I then found that with the following formula, she could read with perfect comfort: O. D. —2.62, O. S. —3.25—2.25 cyl. 165, and I therefore had corresponding lenses set in at the bottom of her glasses. At the end of five days, her muscle of accommodation had strengthened sufficiently for her to read better through the upper focal of the glasses than through the lower. I therefore had two glasses put in according to the original formula, and she now can see perfectly well with them, both for reading and for distance. I am convinced that the object of the oculist should be to eventually give his patient full correction, with glasses which make the eye emmetropic. This is evidently the logical thing to do, but, while

we are doing it, we must make our patients' eyes comfortable, or they will not continue to wear the glasses prescribed. A well known oculist of exceptional skill gave a friend of mine, 42 years old, full correction at once. He wore the glasses faithfully for about a year, but finally, although strongly inclined to conform to the doctor's rules, discontinued their use, declaring that he would probably never wear glasses again. It seems to me, also, that the custom of some oculists of not correcting errors of astigmatism under one dioptry, fails to make the eye emmetropic, with resulting serious injuries to the patient's eyes and nervous system.

Now as regards serious mistakes of the optician. These last may be obviated by the oculist, if he has the means of testing the glasses after they have been ground. Simply neutralizing them, or using a lens measure, and test card, is not sufficient, for this method does not reveal errors as small as one degree. It is necessary that the axis be tested on an axis finding and centering machine, with a revolving dial, in order for small differences to be noted, and without the possession of such an apparatus, oculists have no adequate protection against careless opticians. Within a month, I have carefully tested the glasses ground for my patients by six of the leading opticians of New York City, and, in four cases out of five, they were wrong in the axis, the error varying from two to twelve degrees. Here are a few examples.

Oculist's Prescription.	Filled by Optician.
O. D.+1.12—.37 cyl. 165 O. S.+1.00—.25 cyl. 180 Filled at four different places	1 { O. D.+1.25—.25 cyl. 175 O. S.+1.00—.50 cyl. 2
	2 { O. D.+1.12—.37 cyl. 170 O. S.+1.00—.25 cyl. 175
	3 { O. D.+1.12—.37 cyl. 168 O. S.+1.00—.25 cyl. 178
	4 { O. D.+1.12—.37 cyl. 165 O. S.+1.00—.25 cyl. 4
O. D.—.37—3.37 cyl. 180 O. S.—.50—2.12 cyl. 5	O. D.—.37—3.37 cyl. 177 O. S.—.50—2. 25 cyl. 2
O. D.+.12—.62 cyl. 15 O. S.+.25—.50 cyl. 172½	O. D.+.12—.62 cyl. 18 O. S.+.25—.50 cyl. 175
O. D.—.62 cyl. 15 O. S.—.50 cyl. 172½	O. D.—.62 cyl. 3 O. S.—.50 cyl. 179
O. D.—8.0—3.0 cyl. 22 1/2 O. S.—6. 50—1.50 cyl. 160	O. D.—8.0—3.0 cyl. 26½ O. S.—6. 50—1. 50 cyl. 155
O. D.+4.0—1.75 cyl. 180 O. S.+3. 50—1.75 cyl. 15	O. D.+2.25+1.75 cyl. 92 O. S.+3. 50—1.75 cyl. 18
O. D.+.75 O. S.+.62+.37 cyl. 75	O. D.+.75 O. S.+.50+.37 cyl. .65.

In some cases, small errors in the axis gave no symptoms, and I allowed the patient to retain the glasses, only sending them back to be reground when any discomfort resulted; but the examples given above all caused headaches, nausea, or dizziness. I have many such cases, but will only cite one as a typical example. Without cycloplegia, the patient accepted O. D. —.37 cyl. 170, O. S. —.25 axis 5. With the shadow test, one of the best oculists of New York City, prescribed +.50 axis 90 in both eyes, but under full cycloplegia, the patient accepted O. D. +.37 cyl. 75, O. S. +.25 cyl. 90. This patient has accidently broken many pairs of glasses, and in having the prescription refilled, whenever the axis varied as little as one degree, the result was headache and nausea, which immediately disappeared when the glasses were ground correctly.

To fully determine for myself the condition under which errors occur, I recently visited a factory which fills an average of 175 prescriptions daily. I carefully examined their methods of grinding and testing, and ascertained without difficulty the reason why the axis is so frequently incorrect. The errors occur as follows: The spheres and cylinders are ground first in the rough. They are then given to a young girl, who places them on an axis finder, and turns them around until the cross lines on the dial are continuous, outside and inside the lens. She then marks the glasses with a standard machine, which makes three dots with brown ink in the axis where the lens should be cut. After they have been cut and polished, the *same girl* places them on an old style American axis finder, puts three dots on them in the axis of the cylinder *with a pen,* and then places them on a small card, to determine whether the axis is correct. This card is very small, and the dots, being made with a pen, are often slightly out of line, so that mistakes of a few degrees are necessarily of frequent occurrence. I have returned so many glasses to this particular firm, that they have changed their methods, and glasses after being ground are now examined on a modern axis finder, with a revolving dial four inches in diameter, this reducing errors to a minimum.

Conclusions: (1) It is always advisable to give a patient full correction, if possible, at first, and eventually always, but never to give glasses which are uncomfortable from the outset. The shadow test alone is useless for work which requires such accur-

acy as this, and the only satisfactory method available is to test the eyes under a cycloplegic, with lenses placed in the proper axis.

(2) The oculist is always responsible for any possible errors of the optician as well as his own, and he should therefore have absolute control over the glasses that the patient actually wears. This is only possible if the oculist has the apparatus in his office with which to test the glasses prescribed after they have been ground. Unfortunately, at the present time, very few oculists own the necessary apparatus for this purpose. The number of my own modern axis finder, bought quite recently, is 258, indicating that there are only a very few, at present, in use, and this, of course, includes those used by opticians. I believe that every oculist as well as every optician, should use modern apparatus for testing accurately for himself the glasses prescribed, and that he should consider it a part of his professional duty to test every glass he prescribes after it is ground and before it is given to the patient. I am confident that if this suggestion, based upon large practical experience, be universally adopted, a great improvement will result in he methods and results of ophthalmology.

OBITUARY.

ARGYLL ROBERTSON.*

Argyll Robertson was one of the greatest men although he did not write much.

He studied at Edinburgh, then at Berlin, especially with Robert Remak, finally at London, graduated at St. Andrew's, and became Fellow of the Royal College of Surgeons at Edinburgh, lecturer on ophthalmology, and surgeon to the Royal Infirmary. From 1893 to 1895 he was chairman of the British Ophthalmological Society.

His chief works are: (1) The calabar bean as a new ophthalmic agent (*Edinburg Med. Jour., London Ophth. Jour.*, 1863). (2) On eye symptoms in spinal diseases (*Edinburgh Med. Jour.*, 1869 and 1870). Since the *Edinburgh Medical Journal* is not within easy reach of everyone, I will add that a translation of these two fundamental works into French appeared in the *Annales d'Oculistique*, Vol. LXIII, pages 114 to 127, and Vol. LXIV, pages 25 to 33. To every one who has never read these papers I recommend their study, so that in future he may speak with a perfect understanding of the Argyll Robertson symptom.

"Although the retina is quite sensitive, and the pupil contracts during the act of accommodation for near objects, yet an alteration in the amount of light admitted to the eye does not influence the size of the pupil." These are his own words.

Further publications of Robertson are: (3) The Trephining of the sclerotic in glaucoma (*Ophth. Hosp. Rep.*, VIII, 404). (4) Diphtheritic ophthalmia (1870). (5) Albuminuric retinitis (1871). (6) Tenotomy of the Rectus superior (1873). (7) The operation for entropium (1883). (8) A case of Filaria Loa (1896).

Argyll Robertson possessed a noble character and a high general culture. He was of a stately, imposing exterior. Whoever took part in the International Congress of Ophthalmology at Edinburgh in 1894, will remember with pleasure how he man-

*J. Hirschberg in Centralblatt fuer Augenheilkunde, Feb., 1909.

aged its affairs; and more especially those who had the privilege to enjoy his hospitality and to come, also, in closer contact with his amiable and highly gifted wife.

According to the custom in his country Robertson had to withdraw from the management of the Infirmary when yet in his best years. When his health began to give way, he retired to the idyllic channel-island of Jersey. However, he still visited occasionally a Congress, for instance, the one at Lucerne in 1904,

He died at the age of 72 on January 2, 1909, while travelling in India.

Honor to his memory!

COMPARATIVE POTENCY OF HYOSCIN AND SCOPOLAMIN HYDROBROMIDE IN REFRACTION WORK.

Wendell Reber (*Jour. A. M. A.*, April 25, 1908) examined four young adults whose eyes were practically emmetropic, using one drop of a 1/10 per cent. solution of hyoscin hydrobromide in the right eye of each patient and one drop of a 1/10 per cent. solution of scopolamin hydrobromide in the left, carefully watching the effects. He found that full pupillary dilation was obtained in an average of 35 minutes with the hyoscin and in an average of 47 minutes with the scopolamin. The average time tor the beginning of full cycloplegia under hyoscin was 59 minutes, while the average time under scopolamin was 92 minutes, which indicates that hyoscin is about 50 per cent. more potent than scopolamin in the paralysis of the accommodation for refraction work. Nothwithstanding the fact that most textbooks on materia medica and therapeutics and also most chemists seem to agree that hyoscin and scopolamin hydrobromide are identical in composition and effect, these clinical tests, as well as repeated observations in the general use of the two drugs in refraction work, convince Reber that there is a difference, possibly in the different arrangement of the various molecules, although the total molecular constitution may be the same. He has used hyoscin hydrobromide in 1/10 per cent. solution in about 2,000 cases of refraction and finds it the most satisfactory of all the cycloplegics except atropin. He has never seen any serious toxic results follow its use thus, although it does cause a marked flushing of the face in about one case in fifty. Children are not easily susceptible to its toxic systemic effects according to his experience.

MEDICAL SOCIETIES.

OPHTHALMIC SECTION
ST. LOUIS MEDICAL SOCIETY.

Meeting, December 9, 1908.
Dr. A. E. Ewing presiding.

Gun-shot Wound of the Eyeball.—By Dr. John Green, Jr.

J. E. C., 32 years, was shot in the left eye at 11:30 a.m., October 25, 1908. The shotgun was discharged to the right of and about twenty-five yards from the patient, and at an angle of about 30° with the plane of his body. Vision was immediately abolished. He was seen by a physician who applied a moist antiseptic dressing, and directed him to consult an oculist at once. Two hours after the accident, or at 1:30 p.m., Mr. G. came under my observation. I found a punctured wound of the lower lid at about its middle third, the point of emergence on the inner side of the lid being 5 mm. farther to the left than the point of entrance. 5 mm. down and out from the corneal limbus was a small penetrating wound of the sclera. R. V. 18/12. L. V. hand motions at 6 inches. The pupil dilated moderately well under atropine, but was flattened at the outer, lower margin.

The ophthalmoscope revealed a large blood clot in the lower part of the vitreous. Fundus reflex discernable up and in. A small doubly refracting spherule (bubble of air?) could be seen just above the upper border of the blood clot. At 6 p.m. the same evening an X-ray localization was made in Dr. Carman's office, the picture being taken by an electrician, who was visiting Dr. Carman. This picture indicated that the shot had perforated the sclera posteriorly and lodged in the orbital tissue 2.5 to 3 mm. behind the eye. Treatment consisted of hot saline irrigation, 10% argyrol, and atropia. Internally, calomel and saline purge.

October 27, eye quiet, pupil well dilated and circular. V. 1/15 R. Potassium iodide gtts. x, increasing ter die. October 30, V. counts fingers at 8 feet. Ophthalmoscope showed much dimmer reflex from the upper part of the fundus. November 1, the pa-

tient had a severe pain in the eye lasting about 5 hours. The ophthalmoscope showed a fresh mass of blood lying on top of the original clot. V. hand motion at 3 feet. Dionin 5%, later 10% ordered.

On November 10, at the suggestion of Dr. W. Nobbe, who saw the patient in consultation, he was given a pilocarpine sweat which was repeated on the following day. Diaphoresis was not satisfactory on either occasion. November 11, a second X-ray localization was made by Dr. Carman, which indicated that the shot was contiguous to the globe, perhaps actually attached to the sclera. A third localization, November 20, gave results identical with that of the second. The case then, is a border line one, in which it is difficult to state whether the shot is in, or just outside, the sclera. In order to secure further light on this question, another plate was exposed in the following manner: One-half of the plate was exposed with the patient directing his eyes upward, the other half with the patient directing his eyes downward. This picture shows very clearly that the shot has moved from the position it occupied when the eyes were directed up, to an entirely different position when the eyes were directed down. Furthermore, (the shot having been slightly flattened by its passage through the tissue) it is possible to discern that the direction of the axis of the shot is not the same in the two positions. The shot was apparently moved along a great circle of the spherical globe and the axes of the shot represent tangents to the circle at the first and second positions.

It should be borne in mind that the patient is a man of large frame and may possess an eyeball 1 or 2 mm. longer in the antero-posterior axis than the average eye (which is represented in the localizing diagram). As the fellow eye is slightly hyperopic (1D.) it is not likely that there exists any axial elongation incident to myopia.

At present time V=p. 1. (candle flame at 2m.) Projection is defective.

DISCUSSION.

Dr. Meyer Wiener at a previous meeting had presented some plates of a patient who had a foreign body in the eye similar to Dr. Green's case, in which it was doubtful whether the piece of steel was in the eye or had gone on through. He had had one picture taken with the patient's eye directed upward, and one with the eye directed downward. He had used the Sweet local-

izer and it was shown clearly that the foreign body was in the sclera. Since then he had had in mind a method for exactly localizing foreign bodies, which he had not yet had a chance to try, i. e., to use threads saturated with bismuth solution, placing them across the cornea in such a way that it would be possible to measure the relative distance exactly. He did try in this other case, sticking the point of a needle under the conjunctiva and taking a picture of this.

Dr. E. H. Higbee had seen a case in which the Sweet localizer was used and when the picture was taken, it showed the foreign body, a shot, to be outside of the eyeball. In reality, the shot was within the eyeball and was pressing against the sclera and bulged it up to such an extent that it gave the appearance in the picture of being on the outside.

Dr. J. E. Jennings referred to a case he had seen, the patient being a young man who was shot in the eye with bird shot. Dr. Wells made a localization and stated that the shot was 6 mm. back of the cornea on the temporal side, and 6mm. below the median line, resting against the sclera. The shot was easily removed through a little button-hole flap of the sclera. In any case where there is any doubt about the position of the foreign body, and where there is no light perception, it seemed to him that the best thing to do would be to enucleate the eye and take no chances.

Use of Cycloplegics in Refraction—By Dr. F. E. Woodruff.

The writer believes the use of cycloplegics to be of great importance to both ophthalmogists and patients, and while the majority of ophthalmologists in this country use cycloplegics to a greater or less extent, there are some who claim to get better results without them. He admits that perhaps in many cases as good results can be obtained, but only with great loss of time and repeated visits to the oculist. He gives as his reasons for advocating the use of cycloplegics:

1st. Hypermetropes, because of spasm of accommodation, frequently appear myopic and refuse to accept plus lenses even after repeated trials.

2nd. Hyperopic astigmatism sometimes appears to be myopic astigmatism.

3rd. In simple hypermetropia, correcting the manifest will relieve the symptoms for the time being, but they frequently return

and one can never know, without a cyloplegic what is the total hypermetropia.

4th. Myopes, frequently accept, under a cyloplegic, a weaker glass than they select without one. Low grades of astigmatism, either with or against the rule, are more easily and accurately detected with a cycloplegic.

5th. There is less loss of time for the patient, for while the cycloplegic may take him from his usual vocation for two or three days, unless a cyloplegic is used, repeated visits to the oculist are necessary, and the amount of time lost is, in the aggregate, much greater. This is especially the case in patients at a distance, to whom a visit to the oculist means both hotel bills and railroad fare.

6th. The mydriatic effect of the cycloplegic enables one to examine, more thoroughly, the periphery of the lens and fundus. Any difficulty in ascertaining the true refraction, owing to the enlarged pupil, can be overcome by the use of the stenopäic slit, which the writer considers of invaluable aid in refractive work.

He much prefers the shadow test to the ophthalmoscope as an objective method of determining the refraction; it being a very difficult matter for the operator, even after long practice, to entirely relax his accommodation. The shadow test, especially when used with a cycloplegic, being much more rapid and accurate, and greatly facilitates refraction, especially in routine hospital work.

The writer believes, however, that the trial case is the final resort in refraction, and that the findings at the trial case are the ones from which glasses must be prescribed. In patients under forty, he habitually uses a cycloplegic unless there is some especial contra-indication, and when occasion seems to demand he uses cycloplegics in even older patients. He believes that many times this custom facilitates the ordering of first reading glasses for presbyopes. Of course, in such cases one must be on guard against increasing tension and probable glaucoma. This danger is small, however, with homatropine.

Regarding the kind of cycloplegic, choice may be had between aqueous and oily solutions, tablets and discs of various medicaments, such as homatropine, scopolamine, atropine, etc. As a rule, the writer uses homatropine in solution, in the strength of one grain to a drachm, instilling one drop at bed time and repeating the instillation every ten or fifteen minutes for an hour the next morning.

In cases of strabismus, a spasm of accommodation, astigmatism against the rule and mixed astigmatism, he believes atropine to be preferred. It is his custom, in all cases, to determine thoroughly the manifest error of refraction, and the power of the recti muscles, and the relation between muscles of convergence and accommodation, before using any cycloplegic.

DISCUSSION.

Dr. A. E. Ewing had used cycloplegics early in his practice; it appealed to him as being an ideal method, but he soon found that it got him into a great deal of trouble. His patients were always returning with the complaint that their glasses did not fit, that they could not see through them, etc. He then took up the idea that the accommodation had a natural resting point which could best be determined by means of trial lenses, and the skill of the physician consisted in finding this point of balance. With this determined, the patient would be comfortable. He adopted the method of putting on a glass somewhat too strong, or too convex in hypermetropic cases, and too weak, or less concave than necessary, in myopia and permitting this to be worn for a few minutes until the accommodation became quiet, then adding weak, concave lenses until what seemed to be an acceptable equilibrium was established with vision as nearly normal as possible. He always had his patients report to him in the course of a few weeks and usually found the correction to be satisfactory.

Dr. F. L. Henderson said there were two points in refractive work that must be kept in mind, first, to determine the nature and the amount of the error, and then to prescribe the glasses that best overcome the symptoms caused by that error. It had always seemed to him that the medical profession took itself too seriously, individually and collectively. They were too much inclined to believe that if a thing was not done in their own way, it was done wrong. If a physician found the glass that relieved the symptoms, it made no difference how he arrived at his conclusions. It seemed to him that it was unscientific always to use a cycloplegic and that it was equally as unscientific never to use a cycloplegic. In his own work he endeavored to coax out as much relaxation of the ciliary muscles as possible. There being no contra-indication, he used a cycloplegic and got the static refraction. Then after the cycloplegic effect had worn off, with his knowledge of the static refraction, he believed that he was better

able to prescribe the glass needed than he would be if he relied solely upon the manifest test. In the final test he applied a glass that he thought would relieve the patient of the symptoms complained of, without following any set rule. The chief danger in the use of a cycloplegic was the possibility of the production of glaucoma. This was not a trifling thing, if it really did produce a glaucoma, but he had never yet seen glaucoma produced by a cycloplegic.

If by the use of a cycloplegic, a latent glaucoma was unmasked, it was a question whether it was an injury or a benefit to the patient. Another objection that had been offered, was, it might dry up the milk of a nursing mother. He doubted whether so small an amount of the drug could produce such an effect. As to the use of a cycloplegic at the presbyopic age, he believed that it was of advantage in many cases of beginning presbyopia. He used homatropine in the majority of cases and atropine after homatropine in many cases, and like Dr. Woodruff, had gotten pretty much the same static refraction. He had gotten very definite toxic symptoms from the use of scopolamine in two cases and had never used it since.

Dr. John Green, Jr., said the question of the employment or non-employment of cycloplegics for the determination of errors of refraction is an immensely important one, and deserves the unbiased attention of every ophthalmologist. On this question oculists may be divided into three classes, first, those who rarely, practically never, refract an eye without paralyzing the accommodation; second, those who rarely, practically never, use cycloplegics; third, those who use cycloplegics when it seems unlikely that a satisfactory measurment can be made without them.

It is certainly true that the non-users of cycloplegics are few and far between, at least in this country. Every American textbook insists, in no uncertain way, that complete paralysis of the accommodation is absolutely essential to a correct estimation of the refraction. While there are no statistics available, roughly estimated, 80% of American ophthalmologists use cycloplegics as a routine, 15% use the method more or less frequently and 5% only are definitely opposed to the method. While it may be possible that the many are wrong and the few are right, still the burden of proof unquestionably lies with the few.

The non-users of cycloplegics contend that the eye cannot be compared to a mechanical optical instrument because it is a living

thing subject to the influences of the organism in which it is placed; that the moment we place an eye in an artificial condition (as with paralyzed accommodation) that moment do we, so to speak, isolate that eye from the rest of the organism, cutting off from it a thousand and one influences which may modify its refractive and accommodative function. They point to the fact that the widely dilated pupil permits the entrance of extra-pupillary rays through a portion of the cornea whose refraction may be widely different from that of the central portion. They insist that a careful study of the refractive condition the "natural" eye should be made the basis of a prescription for glasses. In a word they endeavor, by painstaking subjective methods, in which astigmatic charts and the ophthalmometer play an important role, to arrive at a correction which, at the moment, is acceptable and comfortable to the patient. They do not expect that the correction given will be the final one, but insist on re-examination from time to time, with a view of unmasking more and more of the latent error. Thus in the majority of cases, the patient, for the time being is relieved of his symptoms, and should they recur, can again be made comfortable by a slight change in the spherical and cylindrical element.

It must be confessed that this method is trying to both the patience of the examiner and the examined. The laborious efforts of the oculist to unmask, by the fogging method, as much of the latent error as possible, seem utterly futile to the latter day skiascopist, who with a few flashes of his mirror determines, with great accuracy, the static refraction of the eye. The conspicuous merit of the non-cycloplegic method lies in the opportunity it affords for a study of the function of the "natural" eye under the influence of the vital activities of the individual. What is one man's meat is another man's poison, and it by no means follows that the same glass will be accepted by two individuals of equal age whose static refraction and muscular balance are identical.

As complete a knowledge as possible of the dynamic refraction is, in Dr. Green's estimation, a sine qua non of correct refraction. It has been his impression that those who use cycloplegics habitually, do not study the function of the "natural" eye, and pay little or no attention to the influences of the organism. The routine practice of deducting a certain amount from the static refraction as the basis for a prescription of glasses

is especially to be deplored. Such a method leads frequently to serious error. Personally, he is a partisan neither of the non-cycloplegic nor of the cycloplegic school, but occupies a middle ground. He believes we should begin the study of every refraction case by carefully estimating the dynamic refraction, calling to our aid the help of ophthalmometer and astigmatic charts. With the correction thus found, the accommodative capacity is tested by a prolonged reading test. If the slightest uncertainty exists that this correction will fail to relieve the symptoms, he at once orders a cycloplegic and re-examines by skiascopy and the trial case. Finally a post-cycloplegic test is made. He is then in possession of three sets of measurements, on the basis of which the prescription is made up. Certain it is that there are very many cases in which a knowledge of the static refraction is absolutely indispensable, and the oculist who fails to acquire this knowledge need not be surprised if his results are mediocre. He who declines to determine the refraction of a cross-eyed child, for instance, with the aid of complete cycloplegia and objective and subjective methods, cannot be deemed a safe guide in the management of these cases.

Dr. Green sums up: (1) Estimate the dynamic refraction with painstaking care and test the ability of the patient to use this correction for far and near. (2) If any doubt, estimate the static refraction under cycloplegia. (3) Make a post-cycloplegic test. With the knowledge thus acquired the oculist will be in a position to prescribe glasses intelligently.

Dr. Llewellyn Williamson believed that in the great majority of cases, better and quicker results could be obtained by the use of a cycloplegic, but that its use should not preclude efforts to obtain all information possible about the eye in its natural state.

In illiterates, very young children, and especially in strabismus cases, where the refraction must be obtained by retinoscopy, he believed a cycloplegic to be a necessity, for, while retinoscopy could be practiced without a cycloplegic, the results were not so satisfactory.

Dr. J. E. Jennings, when he commenced refractive work, had been taught by Dr. Jackson, of Denver, to determine the complete amount of error under a cylcloplegic, and then giving as nearly as possible a complete correction. In his cases he used one grain of homatropine to thirty drops of water, putting in 4 or 5 drops of the solution. Before he used the cycloplegic he found, ap-

proximately, what glass the vision seemed comfortable with. He had never been able accurately, to ascertain the amount of astigmatism without a cycloplegic. He knew there were men who claimed to be able to do this with the ophthalmoscope, but he had never seen them.

Mr. Gunn, of London, for example, than whom there is no more able ophthalmoscopist, and who prided himself on his ability to refract with the ophthalmoscope, had during his (Dr. Jennings') service at Morfields, been found in error in many cases.

A New Treatment for Corneal Ulcers.—By Dr. E. H. Higbee.

For the past year and a half Dr. Higbee has been using lysol in serpigenous and rodent ulcers of the cornea and has found it is far superior to anything he has used heretofore. He has used it in full strength but finds that a 5% and 10% solution is the best, as the application can be made every day.

It has the properties of penetrating well into the tissues without destroying them, and its antiseptic properties are superior to those of carbolic acid. He always cocainizes the eye, then applies the solution only in the ulcer by means of an applicator wrapped with cotton.

In a series of cases, five of which he reports, he has yet to see any bad results, although in some of them he used it in full strength. A drop of pure lysol having been put in a new born baby's eyes by mistake at one of our hospitals, with no bad effects following, leads him to suggest the following substitute for Crédé's method:

Put a few drops of a 2% solution into each eye without cocainizing, then bathe the entire head and face with a 5% solution. The saponifying action will loosen all the debris; wash this application off with pure warm water and bathe the head and face a second time, then simply dry with gauze.

This method has the advantages of cleansing all parts about the head and face, leaving them aseptic, and is quite as effective as the nitrate of silver.

DISCUSSION.

Dr. Adolf Alt did not understand why there should be such a great difference in the treatment of ulcers with lysol, and in the treatment of ulcers with carbolic acid. He had used pure carbolic

acid in a large number of corneal ulcers and he had found that in some it gave satisfaction and in others the results were not so agreeable.

The doctor had spoken of the caustic properties of carbolic acid. Dr. Alt had never seen any lasting bad results from a corneal burn produced by carbolic acid. About twenty years ago he had under treatment a boy with an infected wound of the eye from a blow with a whip that had been dragged in cow manure. He had used yellow oxide of mercury, heat, atropine, etc., but without any improvement. Finally his druggist had suggested to him that he try the ointment with a new "bland" vehicle and he applied some of this ointment. In a moment the boy's eye was white, and he screamed aloud with pain. Dr. Alt thought it had put the boy's eye out, but the next day it was much better. It developed that this so-called bland vehicle contained a large percentage of carbolic acid.

Dr. Alt asked Dr. Higbee if he knew how to explain the difference between the action of lysol and carbolic acid.

Dr. Higbee said that the saponifying effect of the linseed oil in the lysol protected the eye. He had at St. John's Hospital a young man who had emptied a bottle of carbolic acid over himself and though he had instantly closed his eyes when the acid struck him, yet enough had gotten into one eye so that when he came to the clinic he was so fearfully burned that he would never be able to see again. Lysol did not seem to have so caustic an effect as carbolic acid. He had used lysol more than a year and considered it the nicest preparation he had ever used. He always used a local anæsthetic first, for it is very painful without it.

Every oculist realizes the difficulty in stopping the process of some serpigenous ulcers, and cannot help being grateful for a remedy that will successfully combat this condition.

LLEWELLYN WILLIAMSON, M.D.,
Section Editor.

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. Shoemaker, M.D.,
St. Louis, Mo.

OPERATIONS FOR SECONDARY CATARACT.

Peter A. Callen (*Jr. A. M. A.*, June 22, 1907) says there are three sources of danger in operating on secondary cataracts, viz.: (1) Infection. (2) Traumatism. (3) Relighting inflammation due to the extraction.

Of these, infection is the least to be feared if the proper aseptic precautions are taken. Traumatism is usually the result of the wrong method being employed to make an opening through the secondary cataract. He believes the greatest danger lies in operating before the eye has completely quieted down from the effects of the primary extraction. Concerning the best methods of performing the operation the author concludes as follows:

Secondary membranes, consisting of capsule, gauze-like in texture, readily yield to a discission performed with the knife needle under artificial illumination.

Thin secondary membranes, consisting of one or more bands, require different handling. Simply avoiding these bands in performing a discission with the knife needle is a conservative course that gives a good visual result, followed, however, in some cases by subsequent disaster, due to the traction of the bands on ciliary processes.

Tough resilient bands can be disposed of successfully by the expert use of the thin Graefe knife in one operation by cutting at a right angle to their long axes. Thick, dense secondary membranes within the area of a fairly large pupil can be disposed of by the use of a Graefe knife in two operations, although I do not consider this the best course to pursue.

Bowman's two-needle operation for similar conditions, viz., dense, opaque membranes, covering a fairly large operation field, is mentioned merely to deprecate its use. The essential features of the method depends on tearing the dense membranes.

Judging by my experience in handling all forms of secondary cataracts, other than the thin diaphanous membranes, the forceps scissors affords the safest and most reliable of all instruments.

By a judicious use of the De Wecker scissors the toughest membrane can be cut without any traction either on iris tissue or ciliary processes. In all complicated forms of secondary cataracts, occluded pupil, incarceration or prolapse of iris, it is the only instrument of which a proper use combines a minimum of risk with a maximum of benefit.

Do not tear secondary cataracts. Always cut them.

Disasters following secondary operations are in the main due to tearing methods in operating. The least danger is from infection.

RELATION OF SO-CALLED OPHTHALMIC MIGRAINE TO EPILEPSY.

Alvin A. Hubbell (*Jr. A. M. A.*, August 8) believes that sufficient proof has not been adduced to establish a kinship or transition of migraine to epilepsy or any other disease. He says: "In the first place the pathology and pathogeny of migraine is very obscure. Second, certain symptoms may or may not attend it, such as aphasia, paresis, paresthesia, etc. Some of these are complained of by persons who are neither migrainous nor epileptic. Third, altered states of the nervous system and of metabolism in various ways may induce or aggravate migraine, or, on the contrary, so act as to alleviate it, or perhaps even to stop it entirely, at least for a time."

Since 1888 he has been consulted by over fifteen hundred migrainous patients whom he has carefully questioned in regard to symptoms of epilepsy, and none of that large number had ever had epilepsy in any form or degree nor had it existed in any of their ancestors or descendants, so far as it was possible for him to discover.

Hubbell admits that a patient may suffer with migraine and be subject to epileptic seizures at the same time, but considers that they exist as separate diseases in no way related to each other. He closes with a quotation from Gowers as follows: "The traces of a definite relation of migraine to epilepsy are slight. In extremely rare instances one affection may develop, while the other goes on, and as we have seen, the same premonitory disturbance may even be attached to each. But such cases are so rare as rather to emphasize the rule to which they form the exceptions. When the exceptions are carefully examined they show that any relation to epilepsy is indirect."

HISTORY OF IRIDECTOMY.

S. Lewis Ziegler (*Jour. A. M. A.*, Feb. 13, 1909) reviews the history of iridectomy during the past two hundred years, mentions the different operations for artificial pupil that have been performed, notes "how the pendulum has swung from knife-needle to scissors, and back again," giving the relative advantages of the two operations, describes a number of the knife-needle and iris knives which have been used, and gives a description of his knife-needle operation with four illustrative cases.

Cheselden, in 1728, first described the operation of iridotomy. He used the knife-needle. Janin, in 1768, first performed the scissors operation. Maunoir, Scarpa, Mackenzie and Bowman did the scissors operation, improving on Janin's method somewhat.

In 1873 DeWecker described his very excellent operation, in which with the use of the scissors which bear his name he secured quite brilliant results. In all the scissors operations, however, the danger of escape of fluid vitreous is present. Besides the operation is more difficult to do than the knife-needle operation and there is more traumatism to the eye. After long consideration of these dangers and difficulties von Graefe in 1869 came to the conclusion that the knife-needle operation was the better and advocated this to be done with the sickle-shaped knife.

In 1888 Ziegler devised an operation with a modified Hays knife-needle. He enters his knife near the limbus through the upper part of the cornea and makes two cuts through the iris, joining them above near the entrance of his knife, in the form of an inverted V. The triangular piece of iris usually falls downward or if it does not can be pushed downward, leaving a good sized pupil.

He offers the following as essentials of success in iridotomy by the knife-needle method:

1. A good knife-needle must be carefully selected. We have already concluded that the modified Hays knife-needle is the best model for this purpose. The knife-needle must, of course, have a well sharpened point and edge.

2. The character of the incision in the iris-membrane is of vital importance. It should be a double incision. Guérin, Maunoir, DeWecker and Galezowski recognized this. Guérin

made a crucial incision, Maunoir and DeWecker adopted the triangular flap, while Galezowski advocated the T-shaped cut. Our choice is the V-shaped incision, which is undoubtedly the only one that will cut through all the iritic fibers in such a way as to give us the greatest retraction of the membrane.

3. Absolutely no pressure should be made in cutting with the knife-needle. This must be recognized as the main secret of success, whether you are incising a dense, felt-like iris-membrane, or a thin filmy capsule. If this rule is observed all traction on the ciliary body will be avoided.

4. The knife-needle should slide backward and forward through the corneal puncture with a gentle sawing movement.

5. The corneal puncture and membrane counter-puncture should be far enough apart to make the corneal puncture a good fulcrum for the delicate leverage necessary in executing the iris incision.

6. The knife-needle should be so manipulated that no aqueous shall be lost, as this accident may prevent the completion of the operation, and may increase the tendency to iris hæmorrhage by lowering the ocular tension.

7. Every incision should be made a thoroughly clean cut, and all tearing of the tissues should be avoided.

8. The most perfect artificial illumination should be secured, either by an electric photophore or a condensing lens, as both iridotomy and capsulotomy require constant and close inspection of the operative field.

THE DANGER TO THE CORNEA IN THE OPERATIVE REMOVAL OF THE GASSERIAN GANGLION.

Köllner (*Muenchener Medizinische Wochenschrift,* Dec. 8, 1908), in a study of twelve cases of removal of the Gasserian ganglion, finds that ten of the patients developed keratitis after the operation, the eye being lost in one case. In the other two cases, where the cornea were not affected the sensation of touch was normal in the area supplied by the first division of the fifth nerve in one case and only partially lost in the other. The ten cases had complete insensibility of the cornea.